

ABSTRACT

Rechargeable composite polymer batteries are disclosed employing composite polymer electrolytes comprising an inorganic oxide, exemplified by fumsilic(SiO_2), and an organic polymer, exemplified by poly(vinylidene fluoride)-hexafluoropropene copolymer (PVDF-HFP), gelled with Li-ion battery electrolytes. The composite polymer electrolytes are prepared by forming a suspension of the inorganic oxide in a solution of the organic polymer contained in a suitable carrier solvent, spraying the suspension onto the surfaces of Li-ion battery electrodes to form inorganic oxide-organic polymer composite films that adhere to the electrode surfaces, and gelling the films with Li-ion battery electrolytes in-situ to form composite inorganic oxide-organic polymer gel electrolytes. Li-ion battery cells are then constructed with the resulting electrode-polymer electrolytes.